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BRINKS HOFER GILSON & LIONE
P.O. BOX 10395
CHICAGO, IL 60610

| EXAMINER | |
|---|---|
| MONBLEAU, DAVIENNE N | |
| **ART UNIT** | **PAPER NUMBER** |
| 2878 | |

DATE MAILED: 04/25/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 10/669,149 | STRASSER, ERICH | |
| | Examiner | Art Unit | |
| | Davienne Monbleau | 2878 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *15 March 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-19* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-4,8-15 and 17-19* is/are rejected.

7)☒ Claim(s) *5-7 and 16* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *23 September 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

## DETAILED ACTION

### *Response to Amendment*

The amendment filed on 3/15/06 has been entered. Claim 19 has been amended. Claims 1-19 are pending.

### *Abstract*

The abstract of the disclosure is objected to because it should be narrative in form. The current abstract contains sentence fragments. Correction is required. See MPEP § 608.01(b).

Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

### *Claim Rejections - 35 USC § 112*

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 17 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The phrase "by said absolute position, said scanning signals ... for forming said position" is not clear. First, the scanning signals are used to determine the absolute position, thus the phrase "by said absolute position" is not logical. Second, the phrase "for forming said position"

is not clear because the measuring device is measuring the position of the object – not forming said position. Lastly, comparing the scanning signals is part of the process for determining the position of the object. Thus, the phrase "said scanning signals ... for forming said position" is indefinite.

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

*Claims 1, 8, 12, 18, and 19 are rejected under 35 U.S.C. 102(b) as being anticipated by Mayer et al. (U.S. 2002/0011559).*

Regarding Claim 1, *Mayer* discloses (Figures 1-3) a position measuring instrument comprising a periodic incremental graduation (2) comprising a plurality of graduation periods within one measurement range, a reference marking (R) disposed within said measurement range and integrated with said incremental graduation (2), and an arrangement of detector elements (5, 6, 7) over at least a length of said measurement range for generating a plurality of periodic scanning signals (paragraph [0032]) of which at least one is modified locally by said reference marking (R), and an evaluation device (inherently must be included) that receives said scanning signals and detects at least one scanning signal, modified by said reference marker (R), from said plurality of scanning signals and determines an absolute position of said reference marker (R) within said length of said measurement range as a function of said detected at least one scanning

signal. (See paragraph [0043], which indicates determining absolute position by having reference markers distinguishable from each other by codings.)

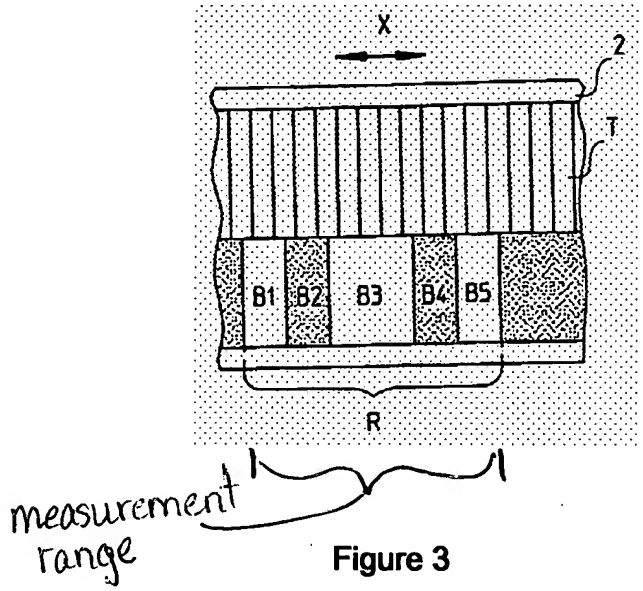


**Figure 3**

Regarding Claim 12, *Mayer* discloses (Figures 1-3) a method for position measurement comprising scanning (paragraph [0032]) a plurality of graduation periods of one incremental graduation (2) by a detector arrangement extending over a length of one measurement range, a reference marking (R) being integrated with one of said graduation periods, and generating a plurality of periodic scanning signals, of which at least one is locally modified by said reference marking (R), detecting (5, 6, 7) said at least one scanning signal, modified by said reference marking (R), from among said plurality of periodic scanning signals, and determining an absolute position of said reference marking within said length of said measurement range as a function of said scanning signal detected. (See paragraph [0043], which indicates determining absolute position by having reference markers distinguishable from each other by codings.)

Regarding Claim 8, *Mayer* discloses (Figure 6) that said reference marking (R) may be a variation of an interstice in a series of equally spaced markings which forms said incremental graduation (2).

Regarding Claims 18 and 19, *Mayer* discloses (Figures 1-3) that the detector arrangements comprising a plurality of detector elements (5, 6, 7), wherein each detector element is assigned to its own corresponding location within said length of said measurement range and said absolute position of said reference marking (R) determined by said evaluation device (inherently necessary) is one of said corresponding locations of said detector elements within said length of said measurement range.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

*Claim 9 is rejected under 35 U.S.C. 103(a) as being obvious over Mayer.*

Regarding claim 9, *Mayer* teaches (paragraph [0044]) that a plurality of reference markers may be used, but does not teach their respective positions with regards to the measurement range. It would have been obvious, however, to one of ordinary skill in the art at the time of the invention to place the second reference marker at a particular location with respect to the first reference marker (R) and the measurement range to optimize detection resolution and thus absolute position detection of said object.

*Claims 2-4, 13-15, and 17, to the extent taught and understood, are rejected under 35 U.S.C. 103(a) as being obvious over Mayer in view of Omi (U.S. 5,841,133).*

Regarding Claim 2, *Mayer* teaches (Figures 1-3, paragraph [0026]) that within said measurement range, N graduation periods are disposed, where N>1 and is an integer. *Mayer* teaches using plurality of detectors (5, 6, 7), but does not teach that said arrangement of detector elements over said length of said measurement range forms N groups, and each of said N groups of detector elements extends over said length of one graduation period, and within each of said N groups, a plurality of detector elements are spaced apart from one another by a fraction of one graduation period, so that, within one of said N groups, a plurality of periodic scanning signals phase-offset from one another are generated. *Omi* teaches (Figure 3) a linear position encoder comprising an incremental graduation (1) with a measurement range and at least two groups of detectors (each with 4 detectors) wherein each detector group extends over one graduation period and the detector elements (PDA, PDAB, PDAB, PDBB) within each detector group are spaced apart from one another by a fraction of one graduation period, so that, a plurality of periodic scanning signals phase-offset from one another are generated. It would have been obvious to one of ordinary skill in the art at the time of the invention to use a plurality of detector groups in a particular configuration in *Mayer*, as taught by *Omi*, to improve the detection resolution and thus position detection accuracy.

Regarding Claim 3, *Mayer* as modified by *Omi* teaches (*Omi*, Figure 3) that in-phase scanning signals of all of said N groups are added together to form a common summation signal.

Regarding claim 4, *Mayer* as modified by *Omi* teaches using the common summation signals to determine the absolute position within one graduation period, but does not teach an

interpolation unit. It would have been obvious, however, to one of ordinary skill in the art at the time of the invention to use particular standard processing circuitry within the evaluation unit, such as an interpolation device, to accurately and quickly analyze the phase signals and calculate the object position.

Regarding claim 13, *Mayer* teaches plural photodetectors (5, 6, 7), but does not teach generating a plurality of scanning signals phase-offset from one another within each graduation period of said measurement range. *Omi* teaches (Figure 3) a linear position encoder comprising an incremental graduation (1) with a measurement range and at least two groups of detectors (each with 4 detectors) wherein a plurality of periodic scanning signals phase-offset from one another are generated. It would have been obvious to one of ordinary skill in the art at the time of the invention to use a plurality of detector groups in a particular configuration in *Mayer*, as taught by *Omi*, to improve the detection resolution and thus position detection accuracy.

Regarding claim 14, *Mayer* as modified by *Omi* teaches (*Omi*, Figure 3) that the scanning signals in-phase with one another in all said graduation periods are added together to form a common summation signal.

Regarding claims 15, *Mayer* as modified by *Omi* (*Omi*, Figure 3) teaches using the common summation signals to determine the absolute position within one graduation period, but does not teach an interpolation unit. It would have been obvious, however, to one of ordinary skill in the art at the time of the invention to use particular standard processing circuitry within the evaluation unit, such as an interpolation device, to accurately and quickly calculate the desired position.

Regarding claim 17, *Mayer* as modified by *Omi* (*Omi*, Figure 3) teaches determining the absolute position within one graduation period by analyzing the output scanning signals.

*Claims 10-11 are rejected under 35 U.S.C. 103(a) as being obvious over Mayer in view of Holzapfel et al. (U.S. 6,452,159).*

Regarding claim 10, *Mayer* teaches (Figure 3) an incremental graduation (2) with an integrated reference mark (R), but does not teach a parallel absolute code. *Holzapfel* teaches (Figure 1b) a position measuring system comprising an incremental code track (12) and a parallel absolute code track (13) for absolute position measurement that is disposed at measurement increments in accordance with said length of one measurement range. It would have been obvious to one of ordinary skill in the art at the time of the invention to use an absolute code track in *Mayer*, as taught by *Holzapfel*, to obtain a coarse absolute position signal.

Regarding Claim 11, *Mayer* as modified by *Holzapfel* teaches (*Holzapfel*, Figure 1b) that said absolute code (13) is a single-track sequential code with successive code elements.

***Allowable Subject Matter***

Claims 5-7 and 16 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter:

Regarding claims 5-7, the cited prior art of record does not teach or fairly suggest a position measuring device comprising, along with the other claimed features, comparing respective in-phase scanning signals with one another and from said comparison said evaluation unit determines one scanning signal for one of said N groups which is modified by said reference

marking, and said one of said N groups determines a position of said reference marking within said length of said measurement range.

Regarding claim 16, the cited prior art of record does not teach or fairly suggest a method for position measurement comprising, along with the other claimed features, that said scanning signals in-phase with one another are compared with one another, and from said comparison, said scanning signal whose amplitude is modified by said reference marking is determined.

The cited prior art of record (*Ueda, Leonard, Snyder*, and *Chee*) teach various position measuring devices that add out-of-phase signals and then have a comparing step, but they do not teach or suggest comparing in-phase signals to determine the location of a reference marker.

***Response to Arguments***

Applicant's arguments filed 3/15/06 regarding claims 1-4, 8-15, and 17-19 have been fully considered but they are not persuasive. Applicant makes the following arguments:

A. *Mayer* does not disclose a position-measuring instrument that includes "a reference marking disposed within said measurement range and integrated with said incremental graduation" (response, page 8).

B. *Mayer* does not disclose "at least one scanning signal, modified by said reference marking" and does not determine "an absolute position of said reference marking within said length of said measurement range (response, page 9).

C. *Mayer* does not disclose an evaluation device (response, page 9).

D. The scanning signals from photodetectors 5 and 6 and the signals from photodetector 7 are not intermingled (response, page 9).

E. There is no disclosure that the absolute position corresponds to one of the positions of photodetectors (5, 6) (response, page 11).

Regarding argument A, this is not persuasive because *Mayer* does disclose (Figures 1-3) the claimed limitation: reference marking (R) is disposed within the measurement range (length) and integrated with said incremental graduation (2). The reference marker (R) and the incremental graduation (2) are integrated in the same device, as is seen from Figure 3, which is a top view of Figures 1 and 2.

Regarding argument B, this is not persuasive because *Mayer* teaches (column 5, lines 5-39) that the reference marker (R) modulates the scanned beams. Thus, the position is determined by a signal modified by a reference marker (R). *Mayer* further discloses (paragraph [0043]) that the reference markers can be designed so they can be distinguished from each by coding. This means that the absolute position of the object would be determined.

Regarding argument C, this is not persuasive because although *Mayer* does not explicitly show an evaluation device, the apparatus inherently must include such a device. In order to use the information that is received by the photodetectors (5, 6, 7) to determine the position of the object, there has to be some kind of processor/evaluation device to manipulate that information. The evaluation device may either be integral with or external to the photodetectors (5, 6, 7).

Regarding argument D, there is no requirement in the claim that the signals be "intermingled." Claim 1 requires "a plurality of scanning signals of which at least one is modified locally by said reference marker." *Mayer* meets this limitation (see response to argument B).

Regarding argument E, this is not persuasive because since the detectors are detecting signals that are then used to determine the absolute position of the object, then the position corresponds to one of the positions of the detectors. The location of the detector affects the signal that it will detect.

***Conclusion***

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure because they teach various position-measuring devices with photodetector arrays and corresponding phase output signals and analysis circuitry.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Davienne Monbleau whose telephone number is 571-272-1945. The examiner can normally be reached on Monday through Friday 9-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Georgia Epps can be reached on 571-272-2328. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Davienne Monbleau

DNM